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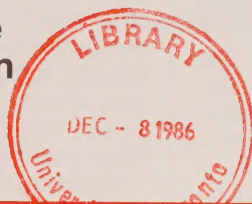


**WELLANDS IN CANADA: A**  
**VALUABLE RESOURCE**





## Land Use Change in Canada



## Wetlands in Canada: A Valuable Resource

Lands Directorate

Fact Sheet 86-4

### Wetlands in Canada

The perception of wetlands as waste lands, available for conversion to more productive uses, has caused millions of hectares of wetlands across Canada to be drained or filled for agriculture, highways, housing, and industrial uses. Increased awareness of the importance of wetlands as wildlife habitat, moderators of watershed hydrology, and recreational areas, has raised national concerns about the extent of wetland loss across the country.

This fact sheet is a summary of studies undertaken by the Lands Directorate, under the Canada Land Use Monitoring Program (CLUMP), examining wetland conversion in several regions of southern Canada. It emphasizes the value of wetlands to Canadians, regional wetland conversion issues and statistics, and federal initiatives to protect remaining wetlands.

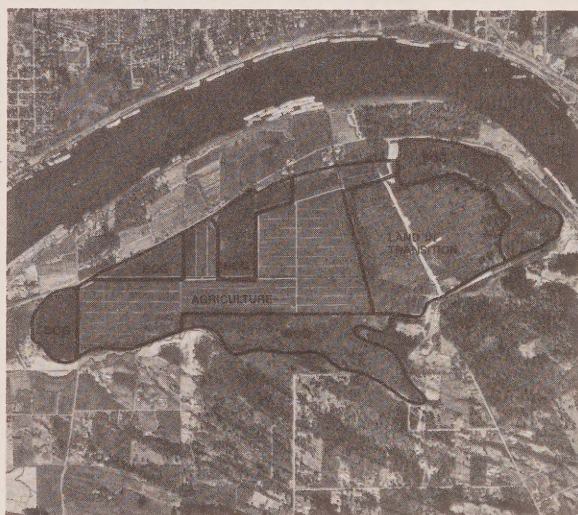
### Highlights

- Wetlands cover approximately 14% of Canada. The distribution of wetlands is concentrated in the provinces of Ontario and Manitoba and in the Northwest Territories.

- Conflicts between wetland conservation and wetland utilization are concentrated in southern Canada, where population, agriculture, and development activities are greatest.
- Agricultural expansion is the major cause of wetland conversion in Canada. Regional studies estimate that 65% of Atlantic coastal marshes, 70% of southern Ontario wetlands, up to 71% of prairie wetlands, and 80% of the Fraser River Delta, British Columbia, have been "lost" – largely to agriculture.
- Over 80% of the wetlands surrounding such centres as Montreal, Chicoutimi-Jonquière, Toronto, Windsor, Winnipeg, Regina, Saskatoon, and Edmonton had been converted to accommodate agriculture and urban expansion by 1981.
- Concern over the continued loss of wetlands by governments at all levels and private individuals has resulted in the development of such wetland protection strategies as the North American Waterfowl Plan and the National Wildlife Area Program.



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## The Value of Wetlands

Wetlands in Canada consist of bogs, fens, swamps, marshes, and shallow open water areas such as the prairie potholes. Recent estimates indicate that approximately 14% of Canada, or 1.27 million km<sup>2</sup>, is covered by wetlands. The distribution of wetlands across Canada varies greatly (Figure 1). Sixty-three percent of Canada's wetlands are concentrated in Manitoba, Ontario and the Northwest Territories.

Historically, wetlands have been perceived as lands having little value. It is now known that they have important ecological, hydrological, and recreational functions. Wetlands are valuable habitat for a wide range of wildlife and unique plant species. They also play a crucial role in the hydrology of watersheds by moderating flood peaks and storm flows, modifying water quality, and buffering shorelines against erosion.

Canadians depend on wetlands for a wide range of recreational and educational opportunities. Wetlands have been central to the establishment of many parks, such as Point Pelee National Park, in Ontario, wildlife and ecological reserves, and recreational areas such as the Delta Marsh, in Manitoba. As well, they offer opportunities for demonstrating and observing ecological principles in a natural ecosystem.

The proximity of wetlands to agricultural and urban areas and a decrease in the availability of high quality land have caused wetlands to become economically valuable lands. Through the drainage, dyking, and infilling of wetlands it is possible to create agricultural land, expanding the local agricultural land base. Similarly, wetland areas can be converted to accommodate urban expansion. Urban and industrial development, although not as extensive as agricultural land reclamation, has brought about the continued and irreversible conversion of wetlands for such uses as harbour facilities, landfill sites, airports, and shopping centres.

FIGURE 1  
Distribution of Wetlands in Canada

Province/Territory	Total Area of Wetlands (000's of ha)	% of Total Area	% of Total Canadian Wetlands
British Columbia	3 120	3	2
Alberta	13 740	21	11
Saskatchewan	9 687	17	8
Manitoba	22 470	41	18
Ontario	29 241	33	23
Quebec	12 151	9	10
New Brunswick	544	8	<1
Nova Scotia	177	3	<1
Prince Edward Island	4	<1	<1
Newfoundland-Labrador	6 792	18	5
Yukon	1 510	3	1
Northwest Territories	27 794	9	22
CANADA	127 230	14	100

Wetlands across southern Canada provide direct economic benefits through the harvesting of wild rice, cranberries, and horticultural peat and sphagnum mosses. Wetlands are also of value for energy and forestry. Research into alternative energy sources has focussed on the feasibility of developing Canada's vast peat resources, particularly in the Atlantic region, as a source of fuel. In some regions of Canada, such as the Clay Belt, in Ontario, as much as 80% of the black spruce (*Picea mariana*) harvest is from wetlands.

Recreation can preserve the natural condition of wetlands, or be a factor in their deterioration. Activities such as hunting, fishing, and bird-watching, are considered non-destructive uses of wetlands. Destructive recreational uses of wetlands include the development of boating facilities, cottages, and other leisure activities, such as the creation of bathing beaches.

The value of wetlands, in both their natural and converted state, has led to conflicts between wetland conservation and wetland utilization. These conflicts are concentrated in four major wetland regions of southern Canada where population, agriculture, and development activities are greatest: the Atlantic Coastal Region; Lower Great Lakes-St. Lawrence Estuary Region; Prairie Pothole Region; and Pacific Coastal Region (Figure 2).

## Trends in Wetland Conversion

### The Monitoring Program

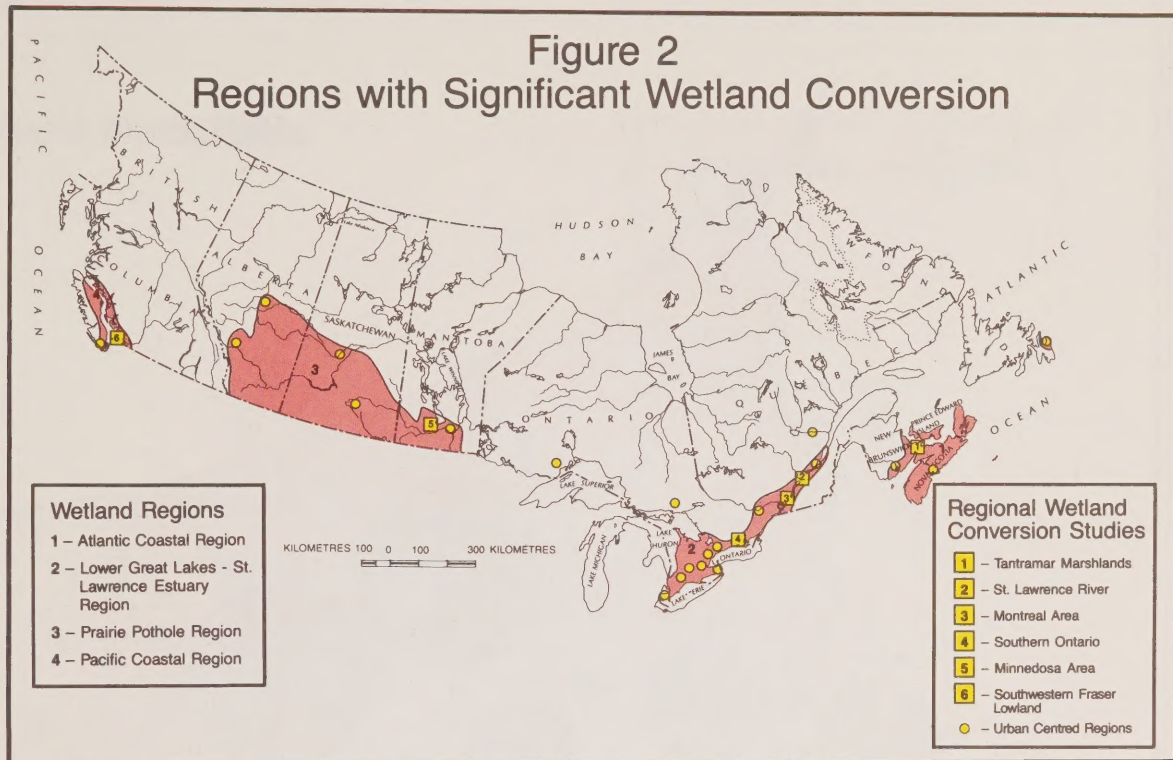
The Canada Land Use Monitoring Program (CLUMP) established the Prime Wetlands Project to provide a national overview of land-use change issues and dynamics on wetlands in southern Canada, improve federal wetland programs, and encourage provincial wetland initiatives. A national overview was obtained by monitoring wetland conversion trends around major Canadian cities and special regional studies. Those studies, and newly initiated research, are summarized below for each of the four major wetland regions.

### Atlantic Coastal Region

Wetlands in the Atlantic coastal region consist of scattered bogs, swamps and shoreline marshes. They provide valuable habitat for fish and wildlife, particularly salmonids and waterfowl. It is estimated that 65% of maritime coastal marshes have been dyked and filled for agriculture. Wetland drainage has also been extensive along the Annapolis, Shubenacadie, Musquodoboit, and Cornwallis rivers in Nova Scotia. It is estimated that by 1978, 42% of the wetlands in the vicinity of Bridgewater in the Annapolis Valley, and 12% of the wetlands along the Musquodoboit River had been converted primarily to agriculture.

The Tantramar Marshlands, at the head of the Bay of Fundy, form the largest expanse of coastal marshland in the Atlantic Region. The marshlands have undergone significant land-use change since settlement. Approximately 80% of the marsh had been dyked and drained for cattle and marsh hay

**Figure 2**  
**Regions with Significant Wetland Conversion**



production by the mid 1800's. A subsequent decline in demand for agricultural products from the marshlands between 1920 and 1930 brought about the abandonment of close to 30% of the agricultural lands by 1960. Since then, approximately 2% of these lands have reverted to coastal salt marsh due to the collapse of some of the dykes which protected them from the tides. About 14% of the land is being actively converted to freshwater marsh through the impoundment of water behind the remaining dykes. Less than 3% of the land has been put into urban related uses.

By 1966, up to 11% of the presettlement wetlands in the vicinity of Halifax, Saint John and St. John's had been converted to other land uses, primarily agriculture. During the period 1966 to 1981, a further 10% of the remaining natural wetlands were converted to agricultural or urban uses around these three cities (Figure 3).

Peat harvesting in the Atlantic region has been limited to horticultural interests and a few energy demonstration projects. To date, the fuel peat potential of the region has been identified, but no extensive mining has occurred. In the future, major development of peat as an energy source could affect extensive wetland areas in the Atlantic region. The development of tidal power in the Maritimes is a potential threat to coastal marshes. The construction of power stations would affect the flow of water to these wetlands. A demonstration tidal power project has been constructed at Annapolis, Nova Scotia.

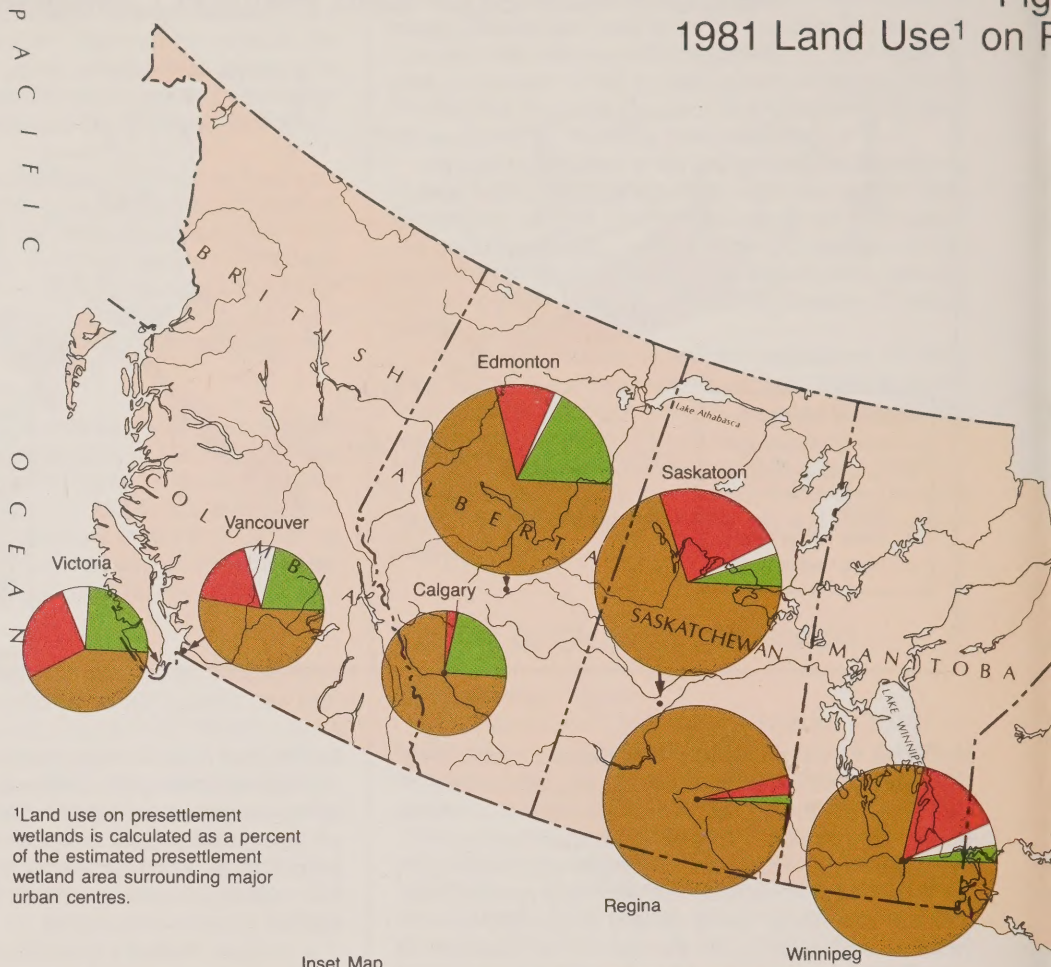
#### *Lower Great Lakes - St. Lawrence Estuary Region*

Wetlands in the Lower Great Lakes - St. Lawrence Estuary region consist of swamps, bogs, fens and marshes. They are important migratory waterfowl and fish habitat, provide protection against shoreline erosion, and act as a flood buffer. Urbanization and agricultural development in Canada reaches its peak in this region.

A study of wetland conversion and distribution in southern Ontario has revealed that approximately 2.38 million ha of wetlands existed prior to settlement. By 1982, 0.93 million ha remained, a decline of 70%. Wetland loss has been most extensive in southwestern Ontario, where over 90% of the natural wetlands have been converted to other land uses. In the Niagara Peninsula, along western Lake Ontario, and in eastern Ontario, 80% have been lost. Recent gross losses from 1967 to 1982 across southern Ontario were 5.2%. For this same period, natural wetlands increased slightly due to the revegetation of abandoned agricultural lands, reducing the net loss of the 1967 wetland area to 1.8%.

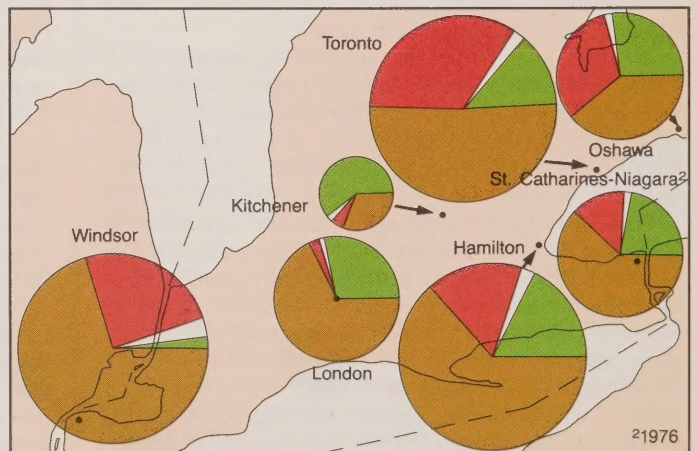
The shoreline wetlands of the Lower Great Lakes - St. Lawrence Estuary have been rated as prime waterfowl habitat, of great importance for migration or for wintering waterfowl. Up to 35% of the wetlands along Lake St. Clair, Lake Erie, and Lake Ontario had been lost to development by 1978. A second study of the St. Lawrence River in both Ontario and Quebec, and selected adjacent rivers for the period 1950 to 1978 identified a 42% conversion of wetlands, from 1950 to

Fig  
1981 Land Use<sup>1</sup> on P



<sup>1</sup>Land use on presettlement wetlands is calculated as a percent of the estimated presettlement wetland area surrounding major urban centres.

Inset Map

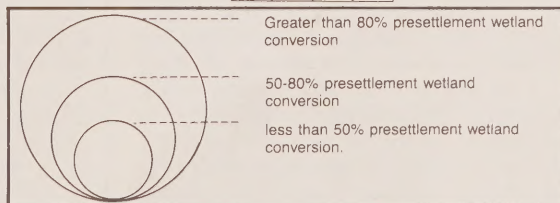
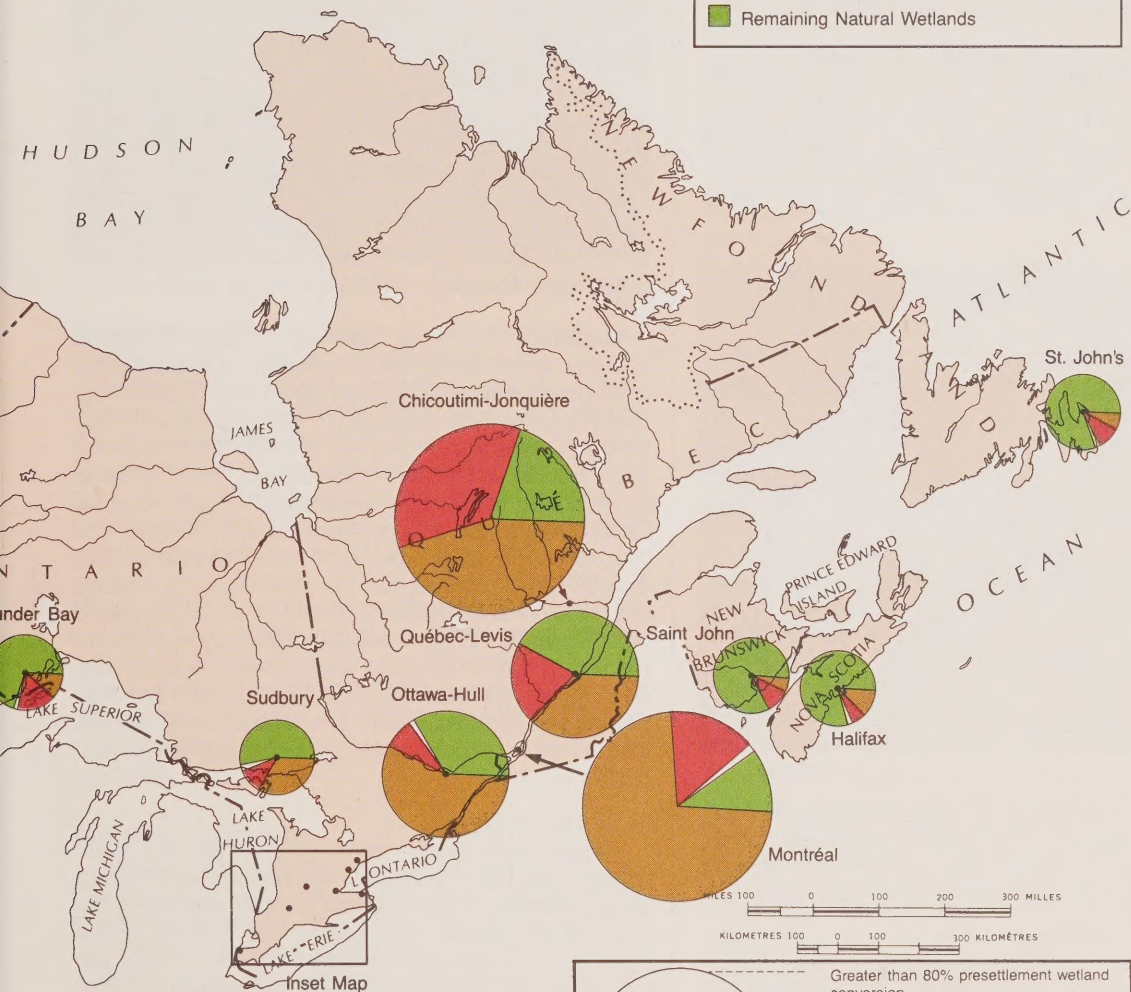


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## Land Use on Presettlement Wetlands

- Recreation
- Urban Activities
- Agriculture
- Remaining Natural Wetlands



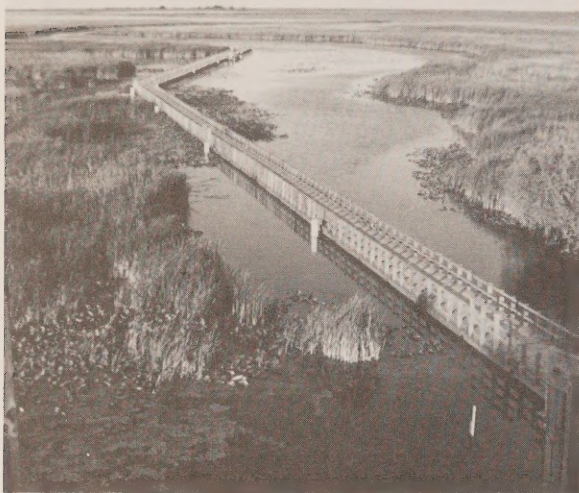
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1965, due primarily to infilling (27%), drainage for cropland and grazing land (33%), and residential expansion (12%). These losses have contributed to the long-term downward trends in some important duck populations.

Extensive wetland conversion has taken place in the rural-urban fringe of all major cities in both Ontario and Quebec. By 1966, as much as 65% of the presettlement wetland area in the vicinity of these cities had been converted to agriculture, and 9% to urban uses. Between 1966 and 1981, the remaining wetland area in the vicinity of Windsor and Toronto was further reduced by 40% and 10% respectively. In 1981, 24% of the former wetlands around Windsor and 34% around Toronto were in urban uses, and 71% and 50% respectively, were used for agriculture (Figure 3).

In Quebec, agricultural and urban expansion caused the continued decline of wetlands in the vicinity of Montreal, Quebec City and Chicoutimi-Jonquière between 1966 and 1981. A detailed study of wetland decline for the Montreal region determined that 5 819 ha of wetland existed in 1966. By 1981, this figure had decreased to 5 427 ha. Major causes



*Lands Directorate*

of this 7% loss were agriculture (25%), urban growth (14%), landfill (11%), industry (10%), and road construction (21%). Wetlands around Quebec City and Chicoutimi-Jonquière were reduced 12% and 17% respectively, during this same period.

#### *Prairie Pothole Region*

The Prairie Pothole region, located in the southern third of Alberta, Saskatchewan, and Manitoba, is the largest single expanse of arable land in Canada and is also the site of the five largest cities of the prairies: Edmonton, Calgary, Regina, Saskatoon and Winnipeg. This fertile area is characterized by an abundance of shallow sloughs or "potholes", varying in size from fractions of a hectare to several hundred hectares. The high density of these wetlands makes this region an important component of the North American migratory bird habitat. The conflict over prairie wetlands for wildlife habitat

versus agricultural use is the most extensively documented wetland issue in Canada. It is estimated that from settlement to 1976, a total of 1.2 million ha of wetland have been converted to agriculture.

Several studies undertaken by the Canadian Wildlife Service on wetland habitat loss have focussed on the Minnedosa pothole region of southwestern Manitoba. Over 50% of the wetlands in this region have been rated as prime waterfowl habitat. From 1928 to 1964, over 50% of the identified potholes were adversely affected by clearing and cultivation of the lands adjacent to wetlands, but only 27% were deemed to be permanently "lost". A further 40% decline in wetland area was reported from 1964 to 1974, and a continued loss of 33% occurred for the 1974 to 1982 period. In 1928, wetlands covered 13.2% of the Minnedosa region, but by 1982, they covered only 3.8%.

A co-operative study to establish base line data for future wetland monitoring has been initiated by Lands Directorate and the Canadian Wildlife Service to create a data base of land use and habitat information to support wetland conservation initiatives such as the North American Waterfowl Management Plan. In addition, land-use change dynamics on wetlands in the Sullivan Lake Plain, Alberta, and Udell Plain, Manitoba, will be determined for the period 1940 to 1985.

Limitations in the data bases used to study changes in wetlands do not permit the identification of the numerous small potholes surrounding the Prairie cities. Consequently, the statistics given below should be interpreted as only identifying overall trends in land-use conversion of major wetlands. It is estimated that by 1966, 76% to 96% of the natural wetlands surrounding Edmonton, Calgary, Regina, Saskatoon and Winnipeg had been converted to other land uses. Over 75% of the conversion was to agriculture, less than 5% for urban uses, and less than 5% for recreational uses. From 1966 to 1981, up to 17% of the remaining natural wetlands in the vicinity of Calgary, Winnipeg, and Edmonton, and 85% around Regina, were converted to other uses. By 1981, up to 76% of the original wetland area had been converted to agricultural uses; 13% to urban uses; and less than 3% to recreation around the five major prairie cities (Figure 3).

#### *Pacific Coastal Region*

Wetlands of the Pacific coastal region are marshes, bogs, swamps, and fens. Floodplains and deltaic-estuaries may contain extensive freshwater and brackish marshes, while tidal flats may include salt marshes. The wetlands of this region are highly valued areas supporting commercially important fish and migratory waterfowl, recreational and educational activities.

A pilot study of wetland loss in the Southwestern Fraser Lowland identified 6 500 ha of natural wetland in the study area in 1967. By 1982, this amount had declined to 4 800 ha, a "loss" of 27%. Analysis of the type of wetland conversion taking place indicated that only 11% of the wetlands were permanently altered: 6% to urban development and 5% to the extraction of horticultural peat. The remainder was



*Canadian Wildlife Service*

actually a change to recreational and conservation uses which would preserve the natural wetland state.

Limited by mountains and the ocean, Vancouver's development is concentrated on the Fraser River Delta, an area identified as both prime wetland and prime agricultural land. Similarly, Victoria has expanded onto discontinuous lowland areas, the site of most wetlands and agricultural lands. In contrast, however, Victoria has only about one-tenth of the presettlement wetland area of Vancouver.

By 1966, approximately 70% of the wetlands in the vicinity of Vancouver and 58% of the wetlands near Victoria had been converted to agriculture. Urban expansion had consumed less than 10% of the available wetlands. Between 1966 and 1981, natural wetlands were further reduced by 16% around Vancouver and 21% around Victoria by the establishment of recreational areas, urban and agricultural expansion.

## National Impact

Wetlands were once abundant in southern Canada, but they are now a scarce prime resource land. Since settlement, approximately 65% of the Maritime tidal and salt marshes, up to 70% of the lower Great Lakes – St. Lawrence River wetlands, up to 71% of the prairie wetlands, and 80% of the Fraser River Delta wetlands have been converted to other uses, primarily agriculture.

The continued incremental conversion of wetlands over time has seriously depleted natural wetland areas at the expense of wildlife which are dependent on these areas for food and habitat. The loss of up to 42% of the shoreline wetlands of the St. Lawrence River, 35% of shoreline wetlands from Lake St. Clair to Lake Ontario, and 71% of prairie wetlands,

many of which are prime waterfowl habitat, has resulted in the serious depletion of certain waterfowl populations.

The expansion of agriculture, urban, industrial, and recreation areas to 1981, has caused a significant decline in the area of natural wetlands in the vicinity of major cities. Up to 98% of the wetlands in the Regina and Windsor area, 88% of the wetlands in the vicinity of Toronto and Montreal, 72% of the wetlands around London, and 18% of the wetlands near Halifax had been converted to other uses by 1981 (Figure 3).

Over the past decade, wetland functions and values have been recognized in both national and international policy and economic spheres. Under the National Wildlife Area program begun in 1966, the Canadian Wildlife Service is acquiring important wildlife habitats. Forty-four national wildlife areas, many of them wetlands, have been designated across Canada, and more are planned. The federal government is a participant in the World Conservation Strategy, launched by the World Wildlife Fund and the International Union for Conservation of Nature and Natural Resources in 1980. The Strategy highlighted wetland preservation as an urgent global concern.

Canada signed the Ramsar Convention on Wetlands of International Importance in 1981, designating seventeen wetland sites for protection. Mary's Point, New Brunswick; Long Point, Ontario; Delta Marsh, Manitoba; Last Mountain Lake, Saskatchewan; and Alaksen National Wildlife Area, British Columbia are only four of the ten Ramsar sites located in southern Canada.

The North American Waterfowl Management Plan was jointly signed in 1986, by the Canadian and United States governments to outline a broad policy framework and objectives for the preservation, maintenance, and restoration of waterfowl habitat important to the survival of migratory waterfowl of both nations. Implementation will protect and improve 1.5 million ha of Canadian Prairie wetlands, 28 000 ha of Great Lakes – St. Lawrence wetlands, and 4 000 ha of wetlands in the Atlantic region for waterfowl habitat over the next 15 year period.

Provincial initiatives, such as wetland inventories and evaluation programs, and increased public awareness of the value of wetlands, have also helped to lay the foundation for wetland conservation. Areas such as Chezzetcook Inlet of Cole Harbour near Halifax; the Oshawa Second Marsh; Byron Bog, London; Beverly Swamp of Hamilton; Rouge River Valley, Toronto; Priddis Slough near Calgary; and Witty's Lagoon near Victoria – are only a few of the specific wetlands which have attracted public attention for conservation.

Immediate legislation to preserve critical wetland habitat, however, has been plagued by a number of constraints typical of major issues regarding land use and land-use change. Fragmented jurisdiction, which spreads responsibility for wetlands among many federal, provincial and municipal agencies, has made wise management difficult.

A principle obstacle to improved decision-making has been inadequate knowledge and experience in expressing the benefit of natural wetlands within the present system of resource allocation. This failure to quantify the ecological and social values of natural wetlands has resulted in a significant loss of wetlands to other land uses whose economic benefit can be more readily determined. A second obstacle to wetland conservation is in valuing the long-term benefits of wetland conservation because these benefits tend to accrue to the public in general, and not exclusively to the private landowner. The wide-reaching nature of wetland benefits and services require broad public support in concert with strong legislation and government programs aimed at conserving these natural systems.

In Canada, the high quality land base for renewable resources is limited. Increased demands for this land results in intensifying land use conflicts. Continued action by local, provincial and federal governments, as well as private individuals, in a cooperative, concentrated fashion is required to develop a strategy which protects wetlands of significant value and benefit to the public and resolves conflicting demands for their conversion.

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## For Further Information

Fact sheets and further information on the Canada Land Use Monitoring Program Prime Wetlands Project may be obtained from Lands Directorate regional offices in Halifax, Ste-Foy, Burlington, Regina, and Vancouver, or from the address below:

Lands Directorate  
Environment Canada  
Ottawa, Ontario  
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